REMARKS

The Office Action includes several objections and rejections, each of which will be discussed in turn.

Support for the Amendment:

Claim 18 is now in independent form. Also, new claims 19-22, depending from claim 18, are added in this amendment. Claims 19-22 are supported by original claims 14-17. No new matter has been added.

Claims 1 and 13 are amended to further characterize the solids as having water within the interstitial spaces of the solids and water absorbed by the solids. Support for the amendment can be found throughout the specification and particularly at page 1, lines 14-20 and 8-9. Additionally, the characterization of the feed stream as aqueous that was presented in the previous amendment has been removed. No new matter has been added.

Claim 17 has been amended to change dependency to claim 14 rather than claim 13 to clarify antecedent basis.

Entry of the amendment is requested. Upon entry of the amendment, claims 1-22 are pending.

Double Patenting Rejection:

Claims 1-7 and 9-17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting over claims 1-12 of copending Application No. 11/247,949. Because the currently pending application contains further amendments to the claims, the Examiner is requested to reconsider the rejection.

Objection to Claims 8 and 18:

In the Office Action, claims 8 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Examiner is thanked for this notification. Claim 18 has been amended to be in independent form. Reconsideration of the objection to claim 18 is requested.

Rejections over US Patent 6,438,867 to Teich et al., US Patent 7,053,036 to DeGroot et al., US Patent 6,743,300 to Gray and US Patent 6,017,505 to Ziegler et al.:

In the Office Action, claim 1-7 and 9-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Teich et al., DeGroot et al., Gray, and Ziegler et al. These rejections are traversed, as explained below.

Independent claim 1 is directed to a process for drying solids initially wet with water. The feed stream according to claim 1 is characterized as comprising solids having water in interstitial spaces and water absorbed by the solids. By specifying that water is absorbed by the solids, claim 1 provides that the solids are capable of absorbing water. It is noted that not all materials are capable of absorbing water. Accordingly, claim 1 specifies solids which are both capable of absorbing water and having water present in the interstitial spaces of the solids. The process of claim 1 also includes combining the feed stream with a first solvent and a second solvent. Claim 1 specifies that the first solvent has a heat of vaporization lower than the heat of vaporization of water and is soluble with water. Claim 1 also specifies that the second solvent has a heat of vaporization lower than that of the first solvent and is miscible in the first solvent.

Independent claim 13 is directed to a process for drying solids in a feed stream whose interstitial spaces are initially wet with water and ethanol wherein ethanol (a first solvent) is used to displace the water in the solids and either ether or n-propyl bromide (a second solvent) is used to displace the ethanol in the solids. The specified solids have water in interstitial spaces in the solids and water absorbed by the solids. Claim 13 further specifies that the ether or n-propyl bromide is removed by the application of heat.

Teich et al. are directed to preparing hydrogels (e.g., silica hydrogels) in a moving bed and countercurrent application. See Teich et al. at column 1, lines 5-27, and column 3, lines 43-67. There are numerous references throughout Teich et al. that refer to the use of a "drying fluid" or a "drying liquid" for drying microporous particles. For example, Teich et al. refer to using water as a drying fluid at column 4, lines 25-26. Teich et al. also disclose the use of a water miscible drying liquid, such as an alcohol, wherein the water is either wholly or partially exchanged for the water miscible drying liquid. See column 4, lines 28-34. A number of other suitable drying liquids are listed at column 4, lines 46-63.

Claim 1 is neither anticipated nor rendered obvious by Teich et al. based upon at least the following reasoning.

First, Teich et al., fail to teach or suggest a drying process wherein solids are wet with water present in interstitial spaces of the solids and wherein water is absorbed in the solids, as required by claims 1 and 13. Instead, Teich et al. relates to a process for drying microporous, fluid-containing particles wherein the fluid is contained "in the pores of the particles to be dried." See Teich et al. at column 1, lines 5-9 and 32-39; at column 2, lines 43-44; and at column 3, lines 45-48. The most common example of particles used in Teich et al. is three-dimensionally networked silica particles wherein the fluid is removed from a silica hydrogel such that the interfacial tension of the fluid in the particles is eliminated in a way that the particles experience no shrinkage during the removal of the fluid. See Teich et al. at column 1, lines 13-21. Teich et al. go even further to establish that, during the drying process, the microporous particles do not lose their properties such as density and thermal conductivity, and that shrinkage of the particles does not occur. It is reasonable to conclude that if the particles disclosed in Teich et al. were capable of absorbing water, the physical properties of the particles would change depending upon the amount of water absorbed. However, because Teich et al. actually establishes an opposite condition (no change in particle properties with the removal of water), Teich et al. fail to teach or suggest a process wherein water is both absorbed by solids and is present within interstitial spaces of the solids, as is required by claims 1 and 13.

Second, Teich et al., fail to disclose a process in which two solvents are utilized to dry solids that are initially wet with water. Rather, Teich et al. disclose the use of a single solvent, such as an alcohol, for drying. While column 7, lines 25-30 of Teich et al. disclose the use of two liquids, only one of the liquids is actually characterized by Teich et al. as being a "fluid suitable for drying." The other liquid, which is used to initially displace the pore liquid, is actually characterized by Teich et al. as being "miscible with the pore liquid, but not suitable for drying." Because the initial displacing liquid is not suitable for drying, it cannot be properly characterized as either of the solvents specified in claim 1. For this same reason, it is not proper to characterize Teich et al. as contemplating the use of more than one of the drying fluids or liquids identified at various locations within column 4 of Teich et al. in a drying process.

Further, the Office Action appears to rely upon claim 8 at column 12 of Teich et al. for the contention that two solvents are used to dry the pore liquid in the particles of Teich et al. Specifically, the Office Action states that the drying process identified as step (d) establishes that a second drying solvent is disclosed. However, the specified drying process of claim 8 in Teich et al., and identified at column 3, line 27, is specified as being conducted in accordance with claim 1. See claim 8 at column 12, line 34-33 which states "wherein the drying in stage (d) is carried out as defined in claim 1." Claim 1 of Teich et al. specifies that the drying be effectuated by "increasing the temperature . . . which comprises supplying the heat required for the temperature increase by convection." Clearly, neither claim 1 nor claim 8 of Teich et al. disclose a drying process utilizing the second solvent of claim 1 of the currently pending application. Therefore, Teich et al. provide no teaching or suggestion of a process in which two solvents are utilized to dry solids that are initially wet with water in the manner specified in claims 1 and 13.

Third, Teich et al., fail to teach or suggest a process for drying solids initially wet with water with a first solvent and a second solvent wherein the first solvent is miscible in water and has a lower heat of vaporization than that of water and wherein the second solvent is miscible in the first solvent and has a lower heat of vaporization than that of the first solvent. As related previously, Teich et al. teaches a process wherein a single solvent application is utilized. Where Teich et al. discuss the use of two liquids, only one is characterized as being suitable for drying. Further, Teich et al. is completely silent as to the heat of vaporization of the fluid not suitable for drying as compared to either the pore liquid or the liquid that is suitable for drying. Clearly, Teich et al. do not teach or suggest the displacement of water with solvents having progressively lower heats of vaporization or the missibility requirements specified in claim 1.

With further reference to claim 13, a process is specified for drying solids in an aqueous feed stream whose interstitial spaces are initially wet with water and ethanol wherein ethanol and either ether or n-propyl bromide are used as the two solvents. Claim 13 further specifies that the ether or n-propyl bromide is removed by the application of heat. In contrast, Teich et al. teach the use of a single solvent to dry microporous particles that are not in a feed stream. Further, Teich et al. do not teach a drying process wherein the solids are initially wet with both water and ethanol. Lastly, Teich et al. fail to disclose the use of heat to remove either ether or n-propyl bromide.

With respect to Ziegler et al., solvents are described at, for example, column 4, line 36 through column 5, line 5. Although Ziegler et al. use the phrase "and mixtures thereof" in reference to listed solvents at column 4, line 42, Ziegler et al. fail to disclose or suggest the use of a first solvent and a second solvent according to either claim 1 or 13. Specifically, Ziegler et al. fail to disclose or suggest a first solvent having a heat of vaporization lower than the heat of vaporization of water and being soluble with water, and a second solvent having a heat of vaporization lower than the heat of vaporization of the first solvent and being miscible with the first solvent. Further Zeigler et al. does not discuss the absorption of water by the solids themselves and thus also fails to teach or suggest a process in which solids have absorbed water and water present in interstitial spaces of the solids

With respect to DeGroot et al., the passages cited in the Office Action refer to the use of a solvent mixture of n-propyl bromide and 1,1,1,3,3-pentafluorobutane for cleaning oil-contaminated substrates and for use as a deposition fluid. As such, DeGroot et al. fail to disclose the use of a first solvent and a second solvent for drying solids in a feed stream according to either claim 1 or 13. Further DeGroot et al. also fails to teach or suggest a process in which solids have absorbed water and water present in interstitial spaces of the solids.

Gray also teaches the use of n-propyl bromide, but not in the context of drying solids in a feed stream in accordance with claims 1 or 13. Rather, Gray teaches the use of solvents to treat materials placed in a cleaning chamber. As such Gray provides no teaching or suggestion of the use of a first solvent and a second solvent for drying solids in a feed stream according to either claim 1 or 13. Further Gray also fails to teach or suggest a process in which solids have absorbed water and water present in interstitial spaces of the solids

To summarize, Teich et al., Ziegler et al., DeGroot et al. and Gray each fail to teach or suggest a process in which solids have absorbed water and water present in interstitial spaces of the solids. As importantly, none of these references teaches or suggest the use of a first solvent having a heat of vaporization lower than the heat of vaporization of water and soluble with water, and a second solvent having a heat of vaporization lower that the heat of vaporization of the first solvent and being miscible with the first solvent.

For at least the aforementioned reasons, claims 1-22 are not obvious over a combination of Teich et al., Degroot et al., Gray and Ziegler et al. Withdrawal of the rejections is requested.

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance.

Respectfully submitted,

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